What Is Claimed Is:

1. In a method of X-ray mammography imaging of a breast having posterior tissue located at the chest wall and a middle and anterior tissue compressed between a paddle and bucky assembly on opposite sides of the breast, the method comprising:

displacing the paddle and bucky assembly relative to one another in the vertical direction to compress the posterior breast tissue at the chest wall in the vertical direction only without pushing posterior tissue at the chest wall away from the chest wall or into the chest wall and from the imaging area;

stopping this vertical displacement prior to compressing the anterior and middle breast portions sufficiently for imaging and in order to lessen the patient's discomfiture with further stretching of the posterior skin of the breast at a chest wall of the patient;

subsequently, in time, using an inclined surface on the paddle or bucky to compress the middle and anterior breast tissue with a second force which is at an angle to the first vertical force and which has a horizontal force component which is lesser than the first vertical force to prevent the anterior or middle breast tissue from pushing the posterior breast tissue toward the chest wall and from the imaging area; and

imaging the compressed posterior, middle and anterior breast tissue.

2. A method in accordance with Claim 1 comprising:

using a paddle having a fixed rigid section, which is X-ray transparent and which extends horizontally from the chest wall and which is positionable against the posterior breast tissue adjacent the chest wall to

compress the posterior tissue to limit pushing of posterior breast tissue from the imaging area; and

flexing an inclined section of the paddle joined at an outer end of the fixed rigid section to apply the subsequent second force through an inclined surface on the inclined section to compress the middle and anterior areas of the breast.

3. A method in accordance with Claim 1 wherein the applying of the second, force to the middle and anterior breast areas comprises:

releasing a holding device which is holding a flexed, inclined paddle portion to allow it to flex downwardly to automatically adjust the tilt angle to each patient's breast shape and density.

4. A method in accordance with Claim 3 comprising:

manually pulling downwardly the flexed inclined paddle portion to apply additional compression for middle and anterior breast tissue when desired by an operator; and

operating the holding device to retain the flexed portion in the position to apply this additional compression to the middle and anterior breast tissue.

5. A method in accordance with Claim 1 comprising:

applying the first vertical force to the posterior breast by opposite surfaces which are extending for a few centimeters from the chest wall of the patient to apply the vertical forces over substantial surfaces on each side of the posterior breast tissue at the chest wall; and

pivoting an inclined section on the support; which is located outwardly of the horizontal section to apply the subsequent and angled second force to compress the middle and anterior areas against the paddle.

6. A method in accordance with Claim 5 comprising:

a bucky assembly pivotally mounted and movable to an inclined position to apply the second force to compress the middle and anterior breast tissue;

imaging the breast with detectors on the bucky assembly; and

pivoting the bucky assembly to position detectors thereon closer to the X-ray source to reduce the heel effect of the longer incident X-rays from the heel of the x-ray tube.

7. A method of compressing a breast having posterior, middle and anterior tissue between a paddle and a bucky assembly for mammographic imaging of the breast, the method comprising:

providing a paddle with a compression surface at the upper side of the breast and a bucky having a compression surface at the bottom side of the breast;

one of said bucky and paddle surfaces having an inclined compression surface;

moving the opposed surfaces relative to one another to compress the posterior portion of the breast adjacent the chest wall between the compression surfaces with a first vertically directed force to force the posterior breast surface to prevent a substantial shifting of the breast tissue in a horizontal direction toward or from the chest wall;

compressing the middle and anterior portions of the breast with a second force from the inclined

compression surface to compress the anterior and middle breast tissue;

the compressed posterior tissue receiving a horizontally directed force component urging it to move horizontally toward the chest wall and from the imaging area; and

the first force holding the vertically compressed tissue against the horizontal displacement from the imaging area adjacent the chest wall by the horizontally directed component provided by the inclined compression surface.

8. A method in accordance with Claim 7 comprising:

providing an X-ray transparent paddle having a rigid flat section with the second opposed surface and a flexed section with the flexed section and using the inclined compression surface to compress the middle and anterior breast tissues.

9. A method in accordance with Claim 7 wherein the applying of the second, compression force to the middle and anterior breast tissue comprises:

releasing a device holding a flexed inclined portion to flex downwardly to automatically adjust the tilt angle to each patient's breast shape and density.

10. A method in accordance with Claim 9 comprising:

manually pulling downwardly the flexed inclined portion to apply additional compression for middle and anterior breast portions when desired by an operator; and

operating a holding device to retain the flexed portion in the position to apply this additional compression to the middle anterior breast areas.

11. A method in accordance with Claim 7 comprising:

compressing the breast tissue with the inclined compression surface located on the bucky assembly and hinged at a location away from the X-ray source so that the hinge does not obstruct the imaging of the posterior breast tissue where the breast joins the chest wall.

12. A method in accordance with Claim 11 comprising:

providing an X-ray imaging detector on the buckey assembly;

positioning an imaging detector located at a anterior portion of the bucky assembly to be closer to the X-ray source than it would be when in a horizontal plane located at the portion of the detector at the chest wall so that the distance between a heel portion of the X-ray source and the anterior area detector portion is shortened for those lesser energy incident rays emanating from a heel of an X-ray source and traveling through the breast to the inclined detector portion.

13. A method in accordance with Claim 12 comprising:

positioning the anterior area, inclined detector portion in the range of at least about three centimeters or more closer to the X-ray source than if it were in a horizontal plane.

14. A method in accordance with Claim 7 comprising:

applying the vertical compression force to opposite sides of the breast first with a compression force extending for a few centimeters from the chest wall to compress the breast tissue with the first vertical

compression force over areas extending horizontally a few centimeters outwardly of the chest wall; and

subsequently applying the second force beginning at an outward end of the first compression force to the middle and anterior areas to compress them with the component of the second force being normal to the chest wall and being insufficient to force the initially compressed posterior tissue towards the ribs and out of the imaging area.

15. A method in accordance with Claim 14 comprising:

first using a paddle with a horizontal portion extending outwardly of the chest wall for at least a few centimeters to apply a first vertical compression force over an area located outwardly for a few centimeters from the chest wall; and

subsequently flexing an inclined, hinged portion on the paddle, which is X-ray transparent, to provide the second compression force at the middle and anterior areas of the breast.

16. A method in accordance with Claim 15 wherein the applying of the second, compression force to the middle and anterior breast tissues comprises:

releasing a device holding a flexed inclined portion to flex downwardly to automatically adjust the tilt angle to the patient's breast shape and density.

17. A method in accordance with Claim 15 comprising:

manually pulling downwardly the flexed inclined portion to apply additional compression for middle and anterior breast portions when desired by an operator; and

operating the holding device to retain the flexed portion in the position to apply this additional compression to the middle anterior breast tissues.

18. A method in accordance with Claim 7 wherein the first compression force is in the range of 25 to 40 pounds and the subsequent, second compression force is in the range of about 10 to 15 pounds.

19. A method in accordance with Claim 16 comprising:

providing a hinged, inclined bucky assembly having a horizontal compression surface thereon to apply the first, vertical compression force to the posterior breast portion adjacent the chest wall, the bucky assembly having an inclined hinged portion with the inclined compression surface to provide the subsequent and second compression force at the middle and anterior areas of the breast.

20. A method in accordance with Claim 7 comprising:

providing an upper cover portion on the bucky assembly with the flat section surface and an inclined section surface; and

providing detectors for imaging on the bucky assembly below the cover portion.

21. A method of improving compression of the middle and interior breast tissue in a mammography system and for lessening of a heel effect of X-rays from a heel of an X-ray source, the method comprising:

moving a bucky assembly having an image detector and a paddle relative to one another to

compress, with a first force, the posterior breast tissue adjacent the chest wall;

tilting an anterior end portion of the bucky assembly toward the paddle to provide a second compressive force to compress the middle and anterior breast tissue;

exposing the breast to X-ray beams to image in the breast; and

moving the bucky assembly and paddle relative to each other to release compression of the breast.

22. A method in accordance with Claim 21 comprising:

positioning a portion of an X-ray detector on the anterior end portion of the bucky assembly closer to the X-ray source to lessen the heel effect of incident X-rays at the anterior breast tissue.

23. A method in accordance with Claim 22 comprising:

holding the compressed posterior breast tissue adjacent the chest wall with a first compression force larger than a horizontal vector force from the second compression force at the middle and anterior breast tissue to prevent displacement of the posterior breast tissue from the imaging area.

24. A method of compression of middle and anterior breast tissue in a mammography system having a paddle for pressing on the breast on the X-ray source side of the breast and having a bucky assembly on the other side of the breast, the method comprising:

providing a tiltable cover on the bucky assembly with the tiltable cover being transparent to the X-ray beams;

moving a first portion on the tiltable cover relative to the paddle to provide a compression of the posterior breast tissue adjacent the chest wall;

tilting the tiltable cover toward the paddle to provide additional compression of the middle and anterior breast tissue; and

exposing the breast to X-ray beams to image lesions in the breast.

25. A method in accordance with Claim 24 comprising:

holding the compressed posterior breast tissue adjacent the chest wall with a first compression force which is greater than a horizontal vector of the additional compression force at the middle and anterior breast tissue to prevent displacement of the posterior breast tissue from the imaging area.

26. In a method of providing a mammogram with an image at the posterior breast tissue at the chest wall and at breast middle and anterior tissues, the method comprises:

providing a paddle for overlying the breast;

providing a bucky assembly pivotably mounted for breast compression;

moving the bucky assembly relative to the paddle and applying a compression force to compress the breast; and

directing an X-ray beam through the compressed breast tissue to image the breast.

27. In an apparatus for X-ray mammography imaging of a breast having posterior tissue located at the chest wall and a middle and anterior tissue without obstructing the imaging of the breast comprising:

an X-ray source for applying X-rays to image the breast;

a paddle located between the X-ray source and the breast;

a compressing surface on the paddle being transparent to X-rays without an occluding hinge or portion of the paddle in the mammography image of the breast;

a bucky assembly on a side of the breast opposite the paddle and having a compression surface engaging the breast;

a drive for shifting the paddle compressive surface and bucky compression surface relative to one another to compress the breast therebetween;

said compressive surfaces compressing the posterior breast tissue adjacent the chest wall with vertically directed force only without pushing the posterior breast tissue away from the chest wall and to compress this posterior breast tissue sufficiently to lessen any subsequent pushing of breast tissue toward the chest wall; and

an inclined compressive surface portion on one of the compressive surfaces for subsequently, in time, applying a second compression force to compress the middle and anterior breast tissue with a second force which is at an angle to the first force and which has a horizontal component lesser than the first vertical force to limit pushing of posterior breast tissue toward the chest wall.

28. An apparatus in accordance with Claim 27 comprising:

the paddle having a first horizontal portion projecting outwardly from the chest wall to apply the first compressive force at the posterior breast; and

an inclined portion on the paddle joined to an end of the first portion of the paddle at a location substantially outwardly of the chest wall to apply the second compressive force to the middle and anterior portions of the breast.

29. An apparatus in accordance with Claim 28 comprising:

an X-ray transparent hinge portion on the paddle joining the chest wall projecting portion and the inclined portion for hinging movement of the inclined portion relative to the projecting portion.

30. An apparatus in accordance with Claim 29 wherein:

the inclined portion is biased to flex to engage and compress the breast; and

a releasable holding device holds the inclined portion in its flexed position until the holding device is shifted to a release position releasing the inclined portion to flex to compress the breast.

31. An apparatus in accordance with Claim 27 comprising:

the bucky assembly having the inclined portion for compressing the anterior and middle breast portions.

32. An apparatus in accordance with Claim 31 comprising:

a pivot mounting on the bucky assembly for pivotal movement of the bucky assembly to compress the anterior and middle portion of the breast.

33. An apparatus in accordance with Claim 31 wherein:

the drive comprises a first vertical drive to shift the paddle and bucky in a vertical direction to compress the posterior breast portion; and

the drive comprises a second drive for shifting the inclined portion on the bucky assembly to compress the anterior and middle breast portions.

34. An apparatus in accordance with Claim 31 wherein:

the buckle assembly comprises a detector for the X-rays and the detector is shifted toward the X-ray source to shorten the distance between the detector at the anterior breast and the X-ray source.

35. A bucky for use with an X-ray mammography machine wherein said machine includes a bucky and a compression paddle for compressing a patient's breast therebetween, said bucky being controllably tiltable in relation to said compression paddle.

36. A bucky as in Claim 35 wherein said bucky is pivotable on a pivot point that enables the bucky to compress an extended area of the breast extending toward the nipple end of the breast.

37. A bucky as in Claim 35 that includes a pivoting mechanism that has a pivot point external of the pivoting mechanism.

38. A bucky as in Claim 35 including a drive mechanism for controllably moving said bucky from a first position to a selected second position angled with respect to said first position.

39. A bucky for use with an X-ray mammography machine wherein said machine includes a bucky and a compression paddle for compressing a patient's breast therebetween, said bucky including a cover that is controllably tiltable in relation to said compression paddle.

40. An X-ray mammography machine including a bucky and a compression paddle wherein the bucky and compression paddle are movable relative to one another, and wherein said bucky is tiltable to provide an extended area of breast compression.

41. A breast compression paddle for use with an X-ray machine, said paddle being positionable over a patient's breast for compressing said breast for the taking of mammography images comprising:

a tray-like member formed of rigid, radiolucent plastic having a bottom surface and a wall form around the periphery of said bottom surface;

said bottom surface comprising a fixed, rigid section positionable over the immediate area of the patient's chest wall and a second rigid but flexible section extending from said fixed section;

said first and second sections having a common band of plastic material, and said second section being flexible and bendable on said common band;

a biasing spring mechanism for providing a selected force to said flexible section; and

whereby in operation said paddle compresses the patient's breast with an essentially vertically downward force in the immediate area of the breast wall and compresses the patient's breast toward the nipple of the breast with a downwardly angled surface.

42. A breast compression paddle as in Claim 41 wherein said bottom surface is flexible along said band, and the opposite side of said flexible section is affixed to said adjustable spring mechanism to enable said flexible section to angle downwardly.

43. A breast compression paddle as in Claim 42 wherein:

said spring mechanism enables said flexible surface to flex downwardly at an adjustable angle of a maximum of about 15° from the horizontal.

44. A breast compression paddle as in Claim 41 further including an aperture in said walls to form a flexing area, said aperture enabling the walls to have minimal stress when said second section is flexed, and manual means for adjusting said spring mechanism.

45. A breast compression paddle for use with a mammography machines that provides an X-ray beam, said paddle having a spring force, said paddle being positionable adjacent a female person's breast, said paddle having a lower surface for pressing against said breast, a first section of said lower surface adjacent said chest wall being fixed, a second section of said lower surface being flexible along a band of said first section, and said lower surface being flexible only from a position substantially spaced from said chest wall to maintain said breast steady during the taking of an X-ray image.

46. A breast compression paddle as in Claim 45 wherein said paddle is made as a rectangular tray-like structure of five sides wherein one side comprises a rigid member that is flexible along a band.

47. A breast compression paddle as in Claim 46 wherein said lower surface of the paddle engages the breast at an angle of up to about 15°, and the end of the paddle adjacent the chest wall will not be movable within the area of the X-ray beam.

48. A breast compression paddle as in Claim 47 further including a manually responsive spring mechanism for applying force to said breast.

49. An adjustable paddle for use in a mammography machine having different modes of operation, the paddle comprising:

a posterior portion for engaging and compressing a posterior portion of the breast;

a biased inclined portion biased downwardly by a predetermined force from an aligned position in which the inclined portion is aligned with the posterior portion and is biased to an inclined position in which the inclined portion is inclined to the posterior portion;

a releasable lock to lock the inclined portion in an inclined position for a tilt mode compression or in the aligned position during an aligned compression operation; and

the releasable lock being released to allow the biasing force to push the inclined portion against the middle and anterior breast portions to compress the breast.

50. An adjustable paddle in accordance with Claim 49 wherein:

the paddle comprises a curved hinge portion between the posterior paddle portion and the paddle

inclined portion with the hinge portion providing the biasing force.

51. A paddle for use in a mammographic machine and for compressing anterior, middle and posterior breast tissue comprising:

a first posterior section having a surface for compressing the posterior breast tissue;

a flexed section biased to move to an inclined position against the middle and anterior breast tissue to compress the same; and

an X-ray transparent hinge section on the paddle between the posterior section and the flexed section for hinging the sections together, the hinge section extending over the breast and allowing X-rays to pass therethrough without causing a shadow on the X-ray image of the breast.

52. A paddle in accordance with Claim 51 wherein the X-ray transparent hinge section comprises:

a band of bendable plastic that bends and conforms to the breast shape.

53. A paddle in accordance with Claim 51 wherein the paddle has plastic posterior and flexed sections:

the hinge section being a living hinge formed of the same plastic as the posterior and flexed sections.